

RESTful services for accessing RxNorm

Lee Peters, M.S. and Olivier Bodenreider, M.D., PhD

U.S. National Library of Medicine, National Institutes of Health, Bethesda, Maryland, USA

Contact information: RXNAVINFO@LIST.NIH.GOV

*RxNorm*¹ is a standardized nomenclature for clinical drugs developed by the National Library of Medicine. The *RxNorm* data set is organized around concepts with normalized drug names which can include information about ingredients, strengths and dose forms. The current dataset comprises 4,770 ingredients, 13,602 brand names, 18,975 clinical drugs, and 15,551 branded drugs. *RxNorm* plays an important role in the certification criteria for electronic health record technology and supports the “meaningful use” of health information technology.

*RxNav*² is a browser for *RxNorm*, as well as an application programming interface (API) designed to allow users to manipulate *RxNorm* programmatically. Examples of use include mapping drug names to *RxNorm* (findRxcuiByString), finding the ingredient(s) corresponding to a brand name (getRelatedByType), and obtaining the list of NDCs for a given drug (getNDCs). *RxNav* and the API automatically provide users with the most recent data, with no need to maintain a local copy of the dataset.

The original API³, released in 2008, is based on web services and relies on the Simple Object Access Pro-

tolocol (SOAP). The list of SOAP-based functions available through this API is listed in Table 1.

More recently, in order to facilitate the use of *RxNorm* by a wider range of users, we developed a RESTful version of the API⁴, compatible with the Representational State Transfer (REST) architecture. In practice, querying *RxNorm* through the RESTful API involves creating URLs consisting of:

- the base URL for the service (<http://rxnav.nlm.nih.gov/REST/>)
- followed by a “resource” (e.g., /rxcui/151399/properties)

The list of resources (roughly corresponding to SOAP-based functions) is shown in Table 1. The HTTP method GET is used to query the service (e.g., using the Linux command *curl*) and the results are returned in XML or JSON format. Figure 1 shows an example of RESTful query to *RxNorm*, along with the document returned by this query.

¹ <http://www.nlm.nih.gov/research/umls/rxnorm/index.html>

² <http://rxnav.nlm.nih.gov/>

³ <http://rxnav.nlm.nih.gov/RxNormAPI.html>

⁴ http://rxnav.nlm.nih.gov/RxNorm_RESTful_UserGuide.pdf

RESTful resource	SOAP-based function	RESTful resource	SOAP-based function
/	(none)	/spellingsuggestions?name=value	getSpellingSuggestions
/version	getRxNormVersion	/rxcui/{rxcui}	(none)
/displaynames	getDisplayNames	/rxcui/{rxcui}/properties	getRxConceptProperties
/idtypes	getIdTypes	/rxcui/{rxcui}/ndcs	getNDCs
/relatypes	getRelaTypes	/rxcui/{rxcui}/allrelated	getAllRelatedInfo
/termtypes	getTermTypes	/rxcui/{rxcui}/related?tty=values	getRelatedByType
/brands?ingredientids=value	getMultiIngredBrand	/rxcui/{rxcui}/related?rela=values	getRelatedByRelationship
/drugs?name=value	getDrugs	/rxcui/{rxcui}/proprietary?srclist=values	getProprietaryInformation
/rxcui?name=value	findRxcuiByString	&ticket=value	
/rxcui?idtype=value&id=value	findRxcuiById		

Table 1— RESTful resources and corresponding SOAP-based functions for accessing RxNorm

XML output	JSON output
<pre><?xml version="1.0" encoding="UTF-8" standalone="yes"?> <rxnormdata> <idGroup> <name>bactrim</name> <rxcui>151399</rxcui> </idGroup> </rxnormdata></pre>	<pre>{ "idGroup" : { "rxcui" : "151399", "name" : "bactrim" } }</pre>

Figure 1 — Result of the RESTful query <http://rxnav.nlm.nih.gov/REST/rxcui?name=bactrim> (get the *RxNorm* identifier for the drug “bactrim”) in XML and JSON format